

IN VITRO WEAR BEHAVIOR OF VENEERING COMPOSITES.

M. ROSENTRITT, M. SIKORA*, M. BEHR, M. SÖLDNER, G. HANDEL
(Department of Prosthetic Dentistry, University of Regensburg, Germany)



263

Introduction

The wear resistance of dental composites contributes to the overall performance of the whole restoration, especially in posterior areas. The aim of this study was to compare and rank the wear resistance of veneering composites after aging in an artificial oral environment (AOE) and after three-body abrasion testing (TBT).

Materials and methods

Ten samples of each series were made according to the manufacturer's instructions. All samples were polymerized using the adequate curing devices and then adhesively luted onto the sample holders (Rocatec, Espe, G; Variolink II, Vivadent, FL).

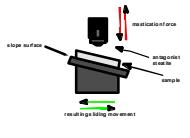
The tested materials were :

Material	Artglass	Dentacolor	Sinfony	experimental material	Columbus	Thermoresin
Manufacturer	Heraeus, G	Heraeus, G	Espe, G	Espe, G	Centres Mateaux, F	GC, J

ARTIFICIAL ORAL ENVIRONMENT (AOE):

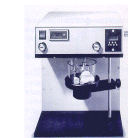
The samples were fixed to a ball bearing slope surface in the AOE to simulate mastication and sliding movement (100.000 cycles 1Hz / 20N; antagonists: Steatite, d=6 mm, 250x5°C/55°C each 2min., H₂O).

As a reference bovine enamel was investigated.

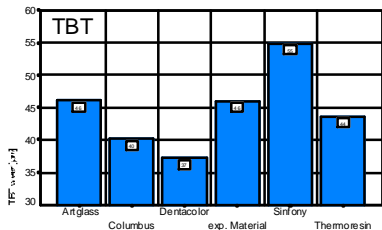
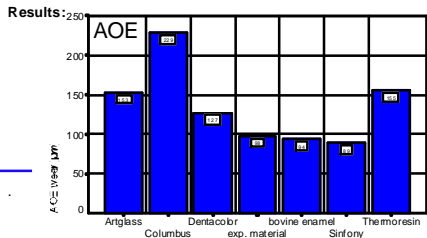


THREE BODY TESTING (TBT):

Three-body testing was performed (Willytec, G; 100.000 cycles: samples 130 U/min, antagonist 60 U/min, force 15N) using food bolus made of 30g millet sheet and 120g rice. Both were mixed for 60s in a grinding machine.



The wear trace after AOE and TBT was measured in comparison to the non-worn surface (Perthometer S6P, Mahr-Feinprüf, G). Mean values and standard deviation were calculated and statistics were performed using Mann-Whitney-U- and Kruskal-Wallis-test (P=0,05).



Mean ± std:	Artglass	Columbus	Dentacolor	Exp. system	Sinfony	Thermoresin	bovine enamel	Fracture Force
wear [µm] AOE	153±30	229±22	127±7	98±13	89±22	155±65	94±26	
wear [µm] TBT	46±13	40±10	37±9	46±6	55±5	44±5	--	
	Artglass	Columbus	Dentacolor	Exp. system	Sinfony	Thermoresin	bovine enamel	Statistics: Mann-Whitney-U test (P=0,05).
Artglass	0.046	0.000	0.002	0.000	0.000	0.002	0.000	AOE
Columbus	0.046	0.000	0.000	0.000	0.000	0.000	0.000	
Dentacolor	0.014	0.079	0.000	0.000	0.000	0.000	0.001	
Exp. system	0.977	0.120	0.010	0.000	0.119	0.000	0.559	
Sinfony	0.129	0.000	0.000	0.000	0.000	0.000	0.528	
Thermoresin	0.000	0.000	0.107	0.100	0.000	0.000	0.000	

Conclusion:

After AOE the exp. System, Sinfony and bovine enamel showed significant lower wear than the other materials. After TBT highest wear resistance could be determined for Dentacolor and Columbus. Statistical significant differences in wear behavior between AOE and TBT could be found. For the estimation of composite wear AOE and TBT tests should be performed.